NHS
Greater Glasgow and Clyde

CLINICAL GUIDELINE

Vascular Access Procedure and Practice Guideline

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Lead Author:	Lynne Robertson
Approval Group:	Board Clinical Governance Forum

Important Note:

The Intranet version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Vascular Access Procedure and Practice Guidelines

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Lead Manager:	Margaret Connolly, Assistant Chief Nurse
Responsible Director:	Dr Margaret Mcguire
Approved by:	NHSGGC Board Clinical Governance Forum
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Introduction

This is the Vascular Access Procedure and Practice Guidelines for vascular access devices (VAD) incorporating NHS Greater Glasgow and Clyde (NHSGGC) adult (acute, mental health and community), paediatric and neonatal services. VADs are inserted for therapeutic purposes such as administration of intravenous (IV) fluids, medicines, blood transfusions and parenteral nutrition (PN). Other purposes for specific vascular access devices are renal dialysis, blood sampling and central venous pressure monitoring.

This document is organised with core introduction followed by care and maintenance templates. The information contained is based on current information available. Quality improvement, audit and research within clinical areas mean that this evidence base is constantly evolving. Practitioners should endeavour to use the most up-to-date evidence on which to base their practice.

The purpose of this guideline is to state the care and maintenance of the following VADs:

- Peripheral Venous Catheter (PVC)
- Midline catheter
- Peripherally Inserted Central Catheter (PICC)
- Non-Tunnelled Central Venous Catheter (CVC)
- Tunnelled Central Venous Catheter (tCVC)
    - Uncuffed tCVC
    - Cuffed tCVC
- Dialysis Central Venous Catheter
- Implantable Ports

The detailed procedures for insertion of VADs are outside the scope of this guideline. Practitioners involved with insertion of VADs will be informed of where specific insertion procedure guidance can be found.

Patients with VADS are placed at increased risk of harm if not appropriately managed, for example healthcare associated infections and bloodstream infections are a significant cause of morbidity and mortality (NICE, 2014). Reports of mortality attributed to device related blood stream infections vary between 12.2% and 34.4% (Wong et al, 2016). VAD related bloodstream infections caused by inadequate device management significantly reduces the survival of patients in our care.

Patient harm can be reduced through:

- Trained and competent staff
- Adherence to relevant policies and guidance
- Underpinning knowledge of different VADs
- Good care and maintenance of VADs
- Appropriate use of care bundles and accurate documentation (e.g. PVC and CVC care plans and patient held records)
- Prevention, early recognition and management of complications
- Inserting VAD only when clinically indicated and removing at earliest opportunity

Scope

This guideline is relevant to all NHSGGC health board staff that care for patients with a VAD.

This guideline should be used in conjunction with other relevant guidelines and standards:

Guidance for all adults receiving Parenteral Nutrition (home and in-patient) can be found here.

Infection prevention and control guidelines can be found here.

NHSGGC IV Medicine Administration policy can be found here.

NHSGGC IV Flush Policy can be found here.

NHSGGC Management of occupational and non occupational exposures to blood borne viruses including needle stick injuries and sexual exposures policy can be found here.

Paediatric guidance:

Haemato-oncology patient's fluid and electrolytes management (Schiehallion) can be found here.

Intravenous fluid guidance for previously well children aged 7 days to 16 years can be found here.

Intravenous fluid therapy in children and young people in hospital can be found here.

West of Scotland Cancer Network Extravasation in Practice Guidelines, policy and tools can be found here.

Staff in specialist clinical areas caring for particularly vulnerable patient groups may have

local standard operating procedures (SOP) in use which should be referred and adhered to.

Roles and responsibilities

For the care and maintenance of any VAD, staff should be appropriately trained and supervised until considered competent. A practitioner can be described as competent if they have had the necessary training, clinical experience, skills and knowledge to undertake a task safely and without supervision. If a practitioner deems it appropriate to adapt the guidelines, a risk assessment must be undertaken and documented appropriately.

Description of VADs

There are several types of VADs. These devices are classified as either a peripheral venous access device or a central venous access device. A VAD is chosen dependent on:

- Clinical need of the patient
- Type of IV therapy / treatment required
- Anticipated length of therapy

Peripheral Venous Catheter (PVC) – a temporary plastic catheter in a peripheral vein to allow bolus injection, infusion, blood transfusion and medicine administration. This device is usually a short term VAD.

Midline catheter – a temporary polyurethane catheter 8 – 20cm in length inserted in a peripheral vein. A midline is a peripheral catheter and does not enter a central vein. Midlines terminate in the peripheral veins. Some midlines are inserted in the lower arm and some in the upper arm, care and maintenance varies depending on device. Users need be aware of which device is inserted and look at the information supplied re care and maintenance. Midlines come in variable gauges that can be inserted at ward level at the bedside or under ultrasound guidance. The size of catheter inserted will depend on the intended duration and nature of treatment. This is ideal for patients who have multiple PVC insertions or require extended term IV access. This catheter is also useful when further haemodilution of medications is required, but not necessarily via a central venous catheter. Both types of midline are maintained and cared for as a peripheral venous catheter.

Peripherally Inserted Central Catheter (PICC) – A Peripherally Inserted Central Catheter (PICC) is inserted into a vein in the upper arm (basilic, cephalic or brachial vein) and is then advanced until the tip is placed in lower superior vena cava (SVC) or proximal right atrium. This is a central VAD that is inserted peripherally, and is used for mid - long term venous access to facilitate administration of extended IV therapy such as cytotoxic chemotherapy,

PN and IV medication that needs to be administered centrally. PICCs have centimetre markings to allow easy observation of migration of the catheter. PICCs can be valved or non-valved, single or multi lumen. A PICC can remain in place for the duration of therapy if no complications occur.

*Neonatal services: PICCs can be placed in any limb, and sometimes the scalp.

Non-Tunnelled Central Venous Catheter (CVC) – A non-tunnelled CVC is inserted directly into a large central vein. They are inserted to provide treatment in the acutely unwell patient for example, the administration of IV medications that require central access, aggressive fluid resuscitation and central venous pressure monitoring. This is a short term central VAD, and is available as a single or multi-lumen device.

Tunnelled Central Venous Catheter (tCVC) – A tCVC is sited with the tip in a large central vein and the catheter is tunnelled to exit the skin surface at a point distant to the entry to the vein. These devices are inserted to provide long term IV therapy, such as chemotherapy and PN. Some tCVCs have a cuff to prevent migration of the catheter and can act as a mechanical barrier to reduce risk of bloodstream infections. A tCVC can be valved or non-valved, single or multi lumen.

Dialysis Central Venous Catheter – A dialysis CVC is a central VAD that is inserted into a large central vein to administer renal dialysis. These CVCs have an access lumen and a return lumen to facilitate the flow of blood for renal dialysis treatment. Dialysis CVCs can be tunnelled or non-tunnelled dependent on length of therapy.

A VAD used for haemodialysis in the paediatric population requires additional considerations. Children may be too small to have formation of an arterio-venous fistula and may be dependent on a VAD for long-term for survival. Small blood volume losses from repeated blood discards become more significant in infants and small children where total blood volume is much less overall. Access and use of a tunnelled VAD for haemodialysis in a child should only be performed by an individual who has completed the relevant training. There are subtle differences between use of a paediatric dialysis CVC and other VAD covered by this guideline - these are covered in full in the paediatric dialysis CVC/VAD training bundle

Implantable Ports - An implanted port is a central venous access device, often referred to as a Port-a-cath®. These are useful for long term vascular access. They are designed to permit repeated access to the venous system for the parenteral delivery of medications, fluids, and nutritional solutions and for the sampling of venous blood.

A port consists of a portal chamber (reservoir), which can be made of special plastic, stainless steel or titanium. It has a silicone septum (injection area) and is attached to a catheter which is tunnelled under the skin and advanced until the tip of the catheter lies in the central venous system (SVC / Right Atrium).

This device is available as a single chamber or double chamber system. The port is always accessed through the septum of the port into the port reservoir using a deflected tip (Huber) needle to prevent coring of the silicone septum and subsequent leakage.

Dwell times of VADs

All VADs should be removed when no longer clinically indicated. VADs may remain in situ for longer than manufacturers recommended dwell time if there is a clinical indication and there are no signs of phlebitis or infection.

Medical and nursing staff should review the need for intravenous therapy, including antibiotics, on a daily basis and consider IV to oral switch over if appropriate The NHSGGC IVOST policy can be found here.

Common principles

The following information contains a number of recommendations when caring for a patient with a VAD, aimed at improving patient safety and reducing the risk of harm.

Consent: Consent is required before practitioners undertake any care for a patient. This may be informal (verbal) or formal (written) for more complex procedures. If there is evidence of impaired capacity, either temporarily or permanently, an adult with incapacity form (AWI) should be completed by medical staff to allow health care practitioners to provide treatment that is required. In emergency situations, practitioners should use clinical judgement as to whether the risks of delaying a procedure outweigh the need for formal consent. The patient should be fully informed and provided with patient information leaflets where necessary.

*****Children and Young people: Those under 16 years have legal capacity to consent (or refuse) treatment on their own behalf, if they are deemed capable of understanding the nature and possible consequences of treatment. A parent or legal guardian may consent to medical treatment ***if*** the child lacks decision-making capacity. NHSGGC Consent policy of healthcare assessment, care and treatment can be found here.

Allergy: Patient's allergies must be checked prior to the procedure from a dressings, topical solutions and medicines perspective. If the patient has a chlorhexidine allergy, alcoholic povidone-iodine solution can be used instead of 2% chlorhexidine in 70% isopropyl alcohol.

*Paediatric / Neonatal Services: 2% chlorhexidine in 70% isopropyl alcohol cannot be used in neonates less that 32 weeks gestation who are less than 7 days old. Refer to local guidelines for further advice. 0.5% chlorhexidine in 70% isopropyl alcohol is recommended as an alternative for babies less than 3 months old.

Principles of VAD inspection: The VAD should be checked and observed any time the catheter is being accessed. If the VAD is not being used for continuous infusions, then the patency of the device should be assessed at least once per day and/or prior to any medicine administration.

Frequency of VAD checks by a healthcare practitioner is dependent on clinical area, patient's clinical condition and types of IV medicines being administered e.g. patients receiving irritant medications may have increased frequency checks; patients in community setting may have a decreased frequency of checks. The new NHSGGC PVC care plan has a twice per day check.

For patients receiving care in the community, the VAD should be inspected on each visit. Observation should include:

- Insertion point and surrounding tissue
- Dressing
- Integrity of VAD
- Security of connections
- Dislodgement or migration of device

If the dressing is loose, damp or soiled it should be replaced immediately and the patency of the VAD should be assessed.

The insertion site should be visually inspected for signs of phlebitis or inflammation through the intact dressings and documented appropriately.

Aseptic Non-Touch Technique (ANTT): This guideline has been written bearing in mind the principles of ANTT (Rowley 2010).

Rule of ANTT: key parts must only come into contact with other key parts or key sites.

Aseptic: free from pathogenic micro-organisms that can be introduced by hands, surfaces and / or equipment

Non-Touch: method used to prevent contamination of **key parts** and **key sites** by hands, surfaces or equipment.

Technique: assess the risk of contamination and choosing the appropriate approach

ANTT states that the key principle to preventing infection is to maintain the asepsis of **key parts** and **key sites.** A **key part** (e.g. tip of syringe) being any part of a device that will come into direct contact with **key sites** (e.g. insertion point / needle free access device). These key parts can be protected by the use of **micro critical aseptic fields** such as the inside of a syringe wrapper, or a sterile cap. This minimizes the risk of contamination of **key parts** and **key sites** which can potentially lead to infection.

A **Standard ANTT approach** would be suitable for uncomplicated procedures where the **key parts** and **key sites** are identified and protected by **micro critical aseptic field.** A **Surgical ANTT approach** would be used for complicated procedures with many **key parts** and **key sites** and a **critical aseptic field** (such as sterile dressing pack and / or sterile drapes) is utilised. Sterile gloves may be necessary to maintain asepsis of the critical aseptic field. The clinician should risk assess each procedure, bearing in mind the condition and location of the patient, to decide the approach required. Further information on ANTT approach can be found here.

Standard Infection control precautions (SICPs): Current local and national guidance advise that Standard Infection Control Precautions (SICPs) should be embedded into all aspects of care delivery including the care of patients with vascular access devices. Practitioners are expected to adhere to the principles of SICPs to reduce patient harm.

Needle Free Access Devices (NFAD): The purpose of NFAD is to reduce the risk of catheter related blood stream infections and reduce needle stick injuries. These should be attached to VADs, unless these connectors are inappropriate for use with a particular VAD.

All needle free access devices, whether single or multiple, with or without extension sets, must be primed before use with IV 0.9% sodium chloride. There are a huge variety of different NFADs available and practitioners should choose a NFAD appropriate to the patient's need and VAD requirements.

Port protectors (*alcohol impregnated): disinfecting port protectors may be considered as part of a strategy to reduce the risk of catheter related blood stream infections.

Administration sets: When an administration set is connected to a VAD, it is essential, that a **closed system** is maintained, avoiding unnecessary disconnection. When the closed system is interrupted it is essential to observe an aseptic non touch technique. Administration sets are single use and should be discarded once disconnected. In some clinical situations, it may not be possible to avoid disconnection of administration sets due to the type of treatment being administered to the patient. The practitioner should assess the rationale for the disconnection. If it is essential for patient care that the treatment / equipment cannot be disposed of, an aseptic non touch technique procedure should be adhered to and the VAD should be flushed with 5ml 0.9%sodium chloride (NaCl) in a 10ml syringe, and the administration set sealed with a sterile bung.

Medicines prescription: All medicines mentioned throughout this document must be prescribed as appropriate. This process of not prescribing or recording the administration of flush solutions (except in paediatric patients) is an authorised *exemption* to the normal practice for all other POMs, as described on the NHSGGC Safe and Secure Handling of Medicines policy. For further information see NHSGGC IV Flush policy.

Flushing of VADs: A turbulent push-pause flush with 0.9% sodium chloride (NaCl) in a 10ml syringe finishing with positive pressure is recommended to maintain catheter patency.

Locking of VADs: Evidence-based research suggests that using a **turbulent push-pause flush with 0.9% sodium chloride (NaCl) in a 10ml syringe finishing with positive pressure** is recommended to maintain catheter patency and 'lock' VADs. However, there

may be clinical indications for VADs that are not in daily use that may require them to be ‘locked’ with a different solution. Advice on alternative solutions should be sought from specialists. Consideration should be given to the type and strength of alternative ‘lock’ that is in place to decide on whether aspiration of the alternative ‘lock’ is required to avoid the administration of the alternative ‘lock’ to the general circulation of the patient. Clear documentation to the use of alternative solutions is required.

Therapeutic holding (paediatrics): In some circumstances it may be necessary to have two staff present during procedures and utilise therapeutic holding to maintain patient safety.

Blood discards: Small blood volume losses from repeated blood discards can have an accumulative effect and can become particularly significant in infants and small children where total blood volume is much less overall. Consideration should be given to the volume discarded and the overall impact this may have.

Complications

There are many complications associated with insertion, care and maintenance of VADs. Specific complications and management will be outlined in the templates.

Most complications and adverse events can be prevented or minimized through:

- Education and training to ensure practitioner competence
- Careful insertion technique
- Adhering to ANTT principles
- “Scrub the hub” before accessing needle free access device (NFAD) – cleaning the NFAD for at least 30secs with 2% chlorhexidine and 70% isopropyl alcohol before use and allowing to dry
- Allowing skin to dry following decontamination (before insertion of VAD and at dressing changes)
- Securing the device appropriately
- Using appropriate dressings, covering puncture site
- Early detection of complications and appropriate management actions taken
- Optimum care and maintenance
- Appropriate flushing using a push-pause technique to ensure patency using 10ml syringe and finishing with positive end pressure
- Flush should be administered before, between and following each medicine administration
- Rotation of all lumens on multi-lumen VADs to reduce risk of occlusion
- Consider removing VAD at earliest opportunity when no longer clinically indicated

Terminology / Glossary

Air embolism: Occurs when one or more air bubble(s) enter a vein or artery and block it. Correct techniques and good practice can minimise risks of air embolism occurring. Signs of an air embolism occurring are increasing signs of breathlessness, chest pain, hypotension and cardiac arrest.

ANTT terminology:

Key part: the critical parts of the equipment, that if contaminated will transfer micro-organisms to the patient e.g. tip of needle or syringe

Key site: any break in the patient's skin integrity that allows an entry point for micro-organisms.

Micro critical aseptic field: the protection of **key parts** by utilising caps, wrappers or covers, ensuring asepsis.

Critical aseptic field: is used when there are a large number of **key parts** and **key sites** or the complexity of the procedure means that they cannot be protected through the use of **micro critical aseptic fields.** A larger sterile surface is utilised such as a sterile dressing pack and / or drape(s) and sterile gloves, ensuring asepsis.

Decontamination: a general term that refers to one or more of the process below:

- **Clean:** reduce the bio burden and remove foreign material. In healthcare settings it is typically performed with water, soap or detergent and materials such as paper towels or impregnated wipes.
- **Disinfection:** the destruction of pathogenic microorganisms, usually by thermal or chemical means.
- **Sterilisation:** a process by which all viable forms of microorganisms (including spores) are destroyed.

Catheter fracture: Fracture and possible dislocation of venous catheter. This can be caused by material weakness or over manipulation of device on insertion. All VADs should be inspected for damage on removal.

Extravasation: The inadvertent leaking of an irritant or vesicant solution from its intended vascular pathway (vein) into the surrounding tissue. A vesicant refers to any medicine or fluid with the potential to cause blisters, severe tissue injury or necrosis if it escapes from the intended venous pathway. The degree of injury may range from mild skin reaction to severe necrosis.

Haematoma: A swelling of blood under the skin causing a hard, painful lump. There are various causes such as transfixation or transection of the vein; inadequate pressure to puncture site on removal of device and unsuccessful attempt at insertion of device.

Infiltration: The inadvertent leaking of a non-vesicant solution from its intended vascular pathway (vein) into the surrounding tissue. It is increasingly seen as a benign event as it generally does not lead to tissue necrosis; however, large volume of infiltrate can cause compression of nerves.

Lattice pattern: Decontamination of VAD entry point and surrounding area should be undertaken using a 'lattice pattern'. This describes gentle repeated up and down, back and forth strokes, using 2% chlorhexidine and 70% isopropyl alcohol, for 30 seconds before working outwards to the periphery.

Needle Free Access Device (NFAD): A needle free connector that is used to facilitate the administration of single or multiple IV infusions, whilst reducing the risk of catheter related bloodstream infections. These can remain in situ for 7days and are available as a single bung and single or multi lumen extensions.

*Some clinical areas may have a rationale to change NFAD more frequently than manufacturer's recommendations e.g. every 72 hours.

Occlusion: A lumen or VAD is blocked by blood, medications or lipids. Risk of occlusion can be reduced through appropriate flushing of VADs (including each lumen of a multi-lumen device) and using a positive end pressure on syringe removal.

Phlebitis: The inflammation of the intima layer of the vein. Signs of phlebitis include localised pain, redness and swelling. There are three main types:

- Mechanical – caused by venous catheter irritation to the lumen of the vein e.g. large PVC in a small vein
- Chemical – caused by irritation from chemicals e.g. medications and chemotherapy
- Infective - usually bacterial and can present in a number of ways including discomfort, local site inflammation, and systemic infection

Valsalva manoeuvre: Forced expiration, usually against a closed airway (with the mouth closed). This causes a change in intrathoracic pressure that dramatically affects venous return, cardiac output, arterial pressure and heart rate.

Review of the Vascular Access Procedure and Practice Guideline

This document has been developed by a Short Life Working Group (SLWG) consisting of

staff representing services across NHSGGC. Following agreement with Chief Nurses/Chief of Medicine, it was then reviewed and ratified by the following groups:

- NHSGGC Acute Services Clinical Governance Forum
- NHSGGC Mental Health Clinical Governance Forum
- NHSGGC Partnerships Clinical Governance Forum
- NHSGGC Board Clinical Governance Forum

This document will be due for review in December 2021 (2 years).

Working group members

The Short Life Working Group (SLWG) consisted of staff representing services across NHSGGC. Services represented on the group and key contacts:

Practice Development practicedevelopment.enquiries@ggc.scot.nhs.uk

Infection Control Pamela.Joannidis@ggc.scot.nhs.uk

Radiology Ann.MacCrimmon2@ggc.scot.nhs.uk

Vascular Access Service Nicola.Wyllie@ggc.scot.nhs.uk

Beatson Oncology Centre Nicky.Donnelly@ggc.scot.nhs.uk

Paediatric and Neonatal services Gillian.Paton2@ggc.scot.nhs.uk

Renal Services Pamela.Sinclair@ggc.scot.nhs.uk

Community and Health Partnerships Leanne.Connell@ggc.scot.nhs.uk

Nursing and Medical services from North, South and Clyde sectors

The following section of the document contains step-by-step templates on the care and maintenance of VAD.

Contents of Practice Guideline Templates:

PVC insertion site assessment and flush

Statement	The continuing need for a PVC should be reviewed and documented twice daily. The PVC insertion site and PVC patency must be assessed for signs of complications to reduce patient harm
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 10ml syringe 5ml vial IV 0.9% sodium chloride (NaCl) 2% chlorhexidine in 70% isopropyl alcohol Clinical waste bag
Timing	PVC check is done twice per day, and the flush a minimum of once per day; before and after medicine administration
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Scrub the hub of the needle free access device for at least 30 seconds using 2% chlorhexidine and 70% alcohol and allow to dry • Using an aseptic non touch technique, access PVC via the needle free access device using a 10ml syringe with 5ml of 0.9% NaCl. Flush the PVC using a push / pause technique * Neonates / paediatric may consider a smaller volume of flush • The flush should be administered with ease. If there are signs of resistance, infiltration, extravasation or inflammation discontinue flushing process and consider replacing PVC • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
The PVC top port should only be utilised in emergency situations as it cannot be adequately decontaminated due to the design of the device. If the PVC has been newly inserted then the topic port is sterile and can be used to administer time critical medications.	
Aftercare	Record procedure in nursing documentation and complete PVC care plan VAD is positioned to ensure skin health is maintained

PVC dressing change

Statement	The PVC is secured with an appropriate sterile dressing, whilst allowing for inspection of the insertion point *Neonatal services refer to local guidelines
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 2% chlorhexidine and 70% isopropyl alcohol Sterile semi permeable transparent dressing Clinical waste bag
Timing	As required if dressing is visibly loose or soiled Every 7 days if it is clinically indicated that PVC is required to remain in situ, and no signs of phlebitis or infection
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Remove and dispose of existing dressing • Discard / change gloves if heavily contaminated with body fluids • Cleanse area around entry site using 2% chlorhexidine and 70% isopropyl alcohol in a 'lattice' pattern and allow to dry • Inspect entry point and surrounding skin for signs of phlebitis or infection • Apply sterile dressing ensuring adherence • Discard all disposable equipment. • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete PVC care plan VAD is positioned to ensure skin health is maintained

PVC removal

Statement	The need for a PVC is assessed on a daily basis and should be removed as soon as it is no longer required
Requirements	PPE (minimal consideration disposable apron and gloves) Clean trolley / tray Sterile gauze swabs Sterile adhesive dressing (check allergies) Clinical waste bag
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Stop all fluids being infused via the PVC and disconnect administration set • Perform hand hygiene • Apply PPE • Carefully remove the PVC dressing • Hold a piece of dry cotton gauze over the insertion site and remove the PVC • Apply firm pressure immediately to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood • After removal the PVC should be inspected for integrity and damage • Apply sterile adhesive dressing to the insertion site, checking for any allergies *Neonatal services may not use an adhesive dressing • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete PVC care plan

PVC complications

Complications should be documented and reported to appropriate members of the clinical team.

Risk	Management
Infiltration	Stop IV administration; remove PVC and re-site, if required. The affected limb could be elevated to encourage lymphatic drainage of the excess fluid.
Extravasation	Stop infusion immediately; leave PVC in situ initially; aspirate any fluid; NEVER flush PVC. Seek immediate advice from pharmacy and medical staff prior to removing PVC, who may advise administration suitable neutralising agent. The PVC can then be removed and re-sited Apply hot pack or cold pack, if appropriate. Subsequent management depends upon the drug involved and degree of damage. Mark area of redness with skin marker. Report in Datix. For Systemic Anti Cancer Therapies to refer to the WoS Extravasation in Practice, Policy, Guidance and Tools
PVC embolism	Remove PVC. Monitor vital signs.
Infection	Device should be inspected for signs of infection or phlebitis each time it is accessed or at least once daily – minimum whilst an in-patient / acute areas. Device should be inspected for signs of infection or phlebitis at each visit for patients receiving care at home / community - minimum Remove PVC, monitor vital signs. Report in Datix.
Phlebitis / Thrombophlebitis	Consider removing PVC and replacing. Treatment will vary depending on the individual patient, and severity of the phlebitis. Seek advice from appropriate clinical team members.
Occlusion	Remove PVC and resite.
Catheter fracture	Inspect PVC on removal. If obvious damage to PVC, report to medical team.
Line dislodgement	Stop infusion immediately. Remove PVC.
Active bleeding	Apply pressure to puncture site until homeostasis is achieved.
Haematoma	Apply pressure to puncture site, monitor site.

Midline patency assessment and flush

Statement	The continuing need for a midline should be reviewed and documented daily. The midline insertion site and midline patency must be assessed for signs of complications to reduce patient harm
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 10ml syringe 5ml vial IV 0.9% sodium chloride (NaCl) 2% chlorhexidine in 70% isopropyl alcohol wipes Clinical waste bag
Timing	The midline should be assessed for patency prior to each medicine administration and at least weekly, if the midline is not in constant use
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Scrub the hub of the needle free access device for at least 30 seconds using 2% chlorhexidine and 70% alcohol and allow to dry • Using an aseptic non touch technique, access midline via the needle free access device using a 10ml syringe with 5ml of 0.9% NaCl. Flush the midline using a push pause technique. Disconnect syringe whilst maintaining positive pressure on syringe plunger. Repeat for each lumen if required ** Neonates / paediatric may consider a smaller volume of flush • The flush should be administered with ease. If there are signs of resistance, infiltration, extravasation or inflammation discontinue flushing process and consider replacing midline • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete PVC care plan VAD is positioned to ensure skin health is maintained

Midline dressing change

Statement	The midline is secured with an appropriate sterile dressing, whilst allowing for inspection of the insertion point
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 2% chlorhexidine and 70% isopropyl alcohol wipe / wand / stick Sterile semi permeable transparent dressing 10cm x 12cm Clinical waste bag
Timing	As required if dressing is visibly loose or soiled Every 7 days if it is clinically indicated that midline is required to remain in situ, and no signs of phlebitis or infection
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Loosen and carefully remove the old dressing in an **upward** direction towards the puncture site, taking care not to pull or dislodge the catheter. • Discard / change gloves if heavily contaminated with body fluids • Cleanse area around entry site with 2% chlorhexidine and 70% isopropyl alcohol wipe / wand / stick in a 'lattice' pattern and allow to dry • Inspect entry point and surrounding skin for signs of phlebitis or infection • Apply sterile dressing ensuring adherence • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete PVC care plan VAD is positioned to ensure skin health is maintained

Midline dressing change, flush and needle free access device change

Statement	The necessary care and maintenance is performed at least weekly to minimize the potential complications and to optimise the life of the catheter
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile field 2% chlorhexidine in 70% isopropyl alcohol solution wipe / wand Adhesive semi permeable transparent dressing 10cm x 12cm Needle free access device x 1 per lumen 10ml luer lock syringe IV 0.9% Sodium Chloride 10ml 23g safety hypodermic needle or blunt filter needle x2 Sterile swab for culture (only if signs of infection) Clinical waste bag / sharps bin
Timing	Every 7 days or sooner if dressing visibly loose or soiled
Aftercare	• Record procedure in nursing documentation and complete PVC care plan VAD is positioned to ensure skin health is maintained
Procedure	• Explain the process to the patient / child and parent and gain consent
	• Perform hand hygiene
	• Using an aseptic non touch technique, open all equipment onto sterile field
	• Perform hand hygiene
	• Apply PPE
	• Loosen and carefully remove the old dressing in an upward direction towards the puncture site, taking care not to pull the catheter
	• Discard / change gloves if dressing is heavily contaminated with body fluids
	• Holding the catheter, clean the site and surrounding skin with the 2% chlorhexidine in 70% isopropyl alcohol wand / stick starting at the puncture site, using a 'lattice' pattern for 30 seconds. Allow to dry
	• Using an aseptic non touch technique, remove needle free access device and discard • Scrub the hub threads with the 2% chlorhexidine in 70% isopropyl alcohol wipe for 30 secs. Allow to dry. Apply primed needle free access device
	• Using an aseptic non touch technique, attach 10ml syringe filled with 0.9% sodium chloride, flush using a push / pause technique, keep positive pressure on plunger of syringe. Apply clamp. Detach syringe • Never flush if resistance felt * Neonates / paediatric may consider a smaller volume of flush
	• Apply semi permeable dressing to site ensuring that the catheter is covered with the dressing and good adherence to the skin
	• Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Midline removal

Statement	The need for a midline is assessed on a daily basis and should be removed as soon as it is no longer required. A midline should not remain insitu after the manufacturers recommended length of dwell time unless there is a clinical indication to do so, and this is documented in the patient notes
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile gauze swabs Sterile adhesive dressing (check allergies) Clinical waste bag
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Stop all fluids being infused via the midline and disconnect the administration set • Perform hand hygiene • Apply PPE • Carefully remove the midline dressing • Discard / change gloves if dressing heavily soiled with body fluids • Hold a piece of dry cotton gauze over the insertion site and remove the midline • Apply firm pressure immediately to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood • After removal the midline should be inspected for integrity, length and damage • Apply sterile adhesive dressing to the insertion site, checking for any allergies • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete PVC care plan Observe midline site for signs of infection, bleeding and bruising

Midline complications

Complications should be documented and reported to appropriate members of the clinical team.

Risk	Management
Infiltration	Stop IV administration, remove midline and re-site The affected limb could be elevated to encourage lymphatic drainage of the excess fluid.
Extravasation	Stop infusion immediately; leave midline in situ initially; aspirate any fluid; NEVER flush midline. Seek immediate advice from pharmacy and medical staff prior to removing midline, who may advise administration suitable neutralising agent. The midline can then be removed and re-sited Apply hot pack or cold pack, if appropriate. Subsequent management depends upon the drug involved and degree of damage. Mark area of redness with skin marker. Report in Datix.
Midline embolism	Remove midline. Monitor vital signs.
Infection	Device should be inspected for signs of infection or phlebitis each time it is accessed or at least once daily – minimum whilst an in-patient / acute areas. Device should be inspected for signs of infection or phlebitis at each visit for patients receiving care at home / community – minimum Remove midline, monitor vital signs.
Phlebitis / Thrombophlebitis	Consider removing midline and replacing. Treatment will vary depending on the individual patient, and severity of the phlebitis. Seek advice from appropriate clinical team members.
Occlusion	Remove midline and resite.
Bleeding	Apply pressure to puncture site until homeostasis is achieved.
Catheter fracture	Inspect midline on removal. If obvious damage to midline, report to medical team.
Infection	Seek advice on swabbing site for culture and sensitivity, monitor vital signs and puncture site for signs of inflammation.
Haematoma	Apply pressure to puncture site, monitor site.
Line dislodgement	Stop infusion immediately. Remove midline.

PICC flush and lock without dressing change

Statement	Care and maintenance is to minimize the potential complications associated with long term central venous catheterisation and to optimise the life of the catheter.
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine in 70% isopropyl alcohol wipes Needle free access device x 1 per lumen (if due changed) 10ml luer lock syringe IV 0.9% Sodium Chloride 10ml 23g safety hypodermic needle or blunt filter needle x 2 Clinical waste bag / sharps bin
Timing	Flush and lock of catheter should be carried out every 7 days. Inspection should be documented on the CVC care plan on a daily basis.
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Observe the external length of the PICC, from the exit site to the start of the hub • Apply clamp • If needle free access device is due changed - Remove needle free access device and discard. Scrub the hub threads with the 2% chlorhexidine in 70% alcohol wipe and allow to dry. Apply new 'primed' needle free access device • If removing lock - using an aseptic non touch technique, attach an empty 10ml syringe, unclamp and gently aspirate 5mls of blood from the PICC. Reapply clamp and discard *Neonatal services and some clinical specialities will not aspirate from PICCs • Using an aseptic non touch technique, attach 10ml syringe filled with 0.9% NaCl, unclamp, flush the catheter using a push / pause technique, keep positive pressure on plunger of syringe. Reapply clamp. Detach syringe. Never flush if resistance felt. Repeat for each lumen if required. * Neonates / paediatrics may consider a smaller volume of flush * Paediatrics – If no infusion to be connected, or lumens not being used, PICC lumen may be flushed with 10iu / ml heparinised saline. Seek advice. • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record • VAD is positioned to ensure skin health is maintained

PICC dressing change

Statement	Care and maintenance is performed at least weekly to minimize the potential complications and to optimise the life of the catheter
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile field 2% chlorhexidine in 70% isopropyl alcohol wand or stick Sterile semi permeable transparent dressing 10cm x 12cm (consider use of chlorhexidine impregnated dressing to reduce risk of CRBSI) Catheter securing device e.g. Statlock, Griplock or steri-strips Sterile swab for culture (only if signs of infection) Clinical waste bag
Timing	Initial dressing change should be undertaken at 24hours post insertion. The catheter securing device should be changed every 7 days, or if visibly loose. Further dressing changes should be carried out every 7 days, or if dressing is visibly loose or soiled
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Open dressing pack. Using aseptic non touch technique, assemble sterile field, open all equipment onto sterile field • Perform hand hygiene • Apply PPE • Loosen and carefully remove the old dressing in an **upward** direction towards the exit site, taking care not to pull or dislodge the catheter. • Discard / change gloves if dressing is heavily soiled with body fluids • Observe the external length of the PICC, from the exit site to the start of the hub. • Holding the catheter, clean the exit site and surrounding skin with the 2% chlorhexidine in 70% isopropyl alcohol wipe / wand / stick starting at the exit site, in a 'lattice' pattern for 30 seconds before working outward to the periphery (an area slightly larger than the new dressing). Allow to dry • **Apply fixation device onto the PICC.** • **N.B. DO NOT PLACE OVER THE EXIT SITE** • Cover exit site with sterile semi permeable dressing, ensuring that the catheter is covered with the dressing • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

PICC dressing change, flush and needle free access device change

Statement	The necessary care and maintenance is performed at least weekly to minimize the potential complications and to optimise the life of the catheter
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine in 70% isopropyl alcohol solution Sterile semi permeable transparent dressing 10cm x 12cm (consider use of chlorhexidine impregnated dressing to reduce risk of CRBSI) Catheter securing device e.g. Statlock, Griplock or steri-strips Needle free access device x 1 per lumen 10ml syringe, luer lock x 3 per lumen IV 0.9% Sodium Chloride 10ml 23g safety hypodermic needle or blunt filter needle x2 Sterile swab for culture (only if signs of infection) Clinical waste bag / sharps bin
Timing	Every 7 days or if dressing is visibly loose or soiled.
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Open dressing pack. Using an aseptic non touch technique, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Loosen and carefully remove the old dressing in an **upward** direction towards the exit site, taking care not to pull the catheter • Remove catheter securing device • Discard / change gloves if dressing is heavily contaminated with body fluids • Observe the external length of the PICC, from the exit site to the start of the hub • Holding the catheter, clean the exit site and surrounding skin with the 2% chlorhexidine in 70% isopropyl alcohol wand / stick starting at the exit site, using a 'lattice' pattern for 30 seconds. Allow to dry • Apply clamp • Using an aseptic non touch technique, remove needle free access device and discard • Scrub the hub threads with the 2% chlorhexidine in 70% isopropyl alcohol wipe for 30 secs. Allow to dry. Apply primed needle free access device • Using an aseptic non touch technique, attach an empty 10ml syringe, gently aspirate 5mls of blood from the PICC and discard (unless obtaining blood cultures – refer to microbiology handbook / blood culture guidance) *Neonatal services will not aspirate from PICCs • Using an aseptic non touch technique, attach 10ml syringe filled with 0.9% sodium chloride, flush using a push / pause technique, keep positive pressure on plunger of syringe. Apply clamp. Detach syringe • Never flush if resistance felt * Neonates / paediatric may consider a smaller volume of flush * Paediatrics – If no infusion to be connected, or lumens not being used, PICC lumen may be flushed with 10iu / ml heparinised saline. Seek advice. • Apply catheter securing device. **DO NOT PLACE OVER EXIT SITE** • Apply semi permeable dressing to exit site ensuring that the catheter is covered with the dressing and good adherence to the skin • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

PICC dressing change, flush, needle free access device change and catheter lock

Statement	The necessary care and maintenance is performed at least weekly to minimize the potential complications and to optimise the life of the catheter
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine in 70% isopropyl alcohol solution wipe / wand Adhesive semi permeable transparent dressing 10cm x 12cm – consider use of chlorhexidine impregnated dressing to reduce risk of catheter related bloodstream infections (CRBSI) Catheter securing device e.g. Statlock, Griplock or steri-strips Needle free access device x 1 per lumen 10ml luer lock syringe IV 0.9% Sodium Chloride 10ml 23g safety hypodermic needle or blunt filter needle x2 Sterile swab for culture (only if signs of infection) Clinical waste bag / sharps bin
Timing	Every 7 days or sooner if dressing visibly loose or soiled
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile file, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Loosen and carefully remove the old dressing in an **upward** direction towards the exit site, taking care not to pull the catheter. • Discard / change gloves if dressing is heavily contaminated with body fluids • Observe the external length of the PICC, from the exit site to the start of the hub • Carefully remove catheter securing connector • Holding the catheter, clean the exit site and surrounding skin with the 2% chlorhexidine in 70% isopropyl alcohol solution starting at the exit site, using a 'lattice' pattern for 30 seconds before working outward to the periphery (an area slightly larger than the new dressing). Allow to dry • Apply catheter securing device. **DO NOT PLACE OVER EXIT SITE** • Apply adhesive semi permeable dressing, ensuring the catheter is covered with the dressing and good adherence to the skin • Apply clamp • Remove needle free access device and discard. Scrub the hub threads with the 2% chlorhexidine in 70% isopropyl alcohol wipe for 30 secs. Allow to dry. Apply primed needle free access device • If removing lock - using an aseptic non touch technique, attach an empty 10ml syringe, unclamp catheter, gently aspirate 5mls of blood from the PICC. Reapply clamp. Remove syringe and discard * Neonatal services and some other clinical specialties will not aspirate from PICCs • Using an aseptic non touch technique, attach a 10ml syringe filled with 0.9% NaCl, unclamp, flush the catheter using a push / pause technique, keep positive pressure on plunger of syringe. Reapply clamp. Detach syringe. Never flush if resistance felt. Repeat for each lumen if required * Neonates / paediatric may consider a smaller volume of flush * Paediatrics – If no infusion to be connected, or lumens not being used, PICC lumen may be flushed with 10iu / ml heparinised saline. Seek advice. • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

PICC removal

Statement	The need for a PICC is assessed on a daily basis and should be removed as soon as it is no longer required. A PICC should not remain insitu after the manufacturers recommended length of dwell time unless there is a clinical indication to do so, and this is documented in the patient notes
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile gauze swabs Sterile adhesive dressing (check allergies) Clinical waste bag
Procedure	• Assess patients bleeding risk and if they are either therapeutically anti-coagulated or have an abnormal clotting screen seek advice from patient's consultant prior to removal • Explain the process to the patient / child and parent and gain consent • Ensure patient is positioned with arm lower than the level of the heart during removal • Perform hand hygiene • Stop all fluids being infused via the PICC • Perform hand hygiene • Apply PPE • Carefully remove the PICC dressing and catheter securing device • Discard / change gloves if dressing heavily soiled with body fluids • Hold a piece of dry cotton gauze over the insertion site and remove the PICC in a slow and steady motion • If resistance is felt, seek advice • Apply firm pressure immediately to insertion site until haemostasis is achieved • After removal the PICC should be inspected for integrity, length and damage • Apply sterile adhesive dressing to the insertion site, checking for any allergies • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record Observe PICC site for signs of infection, bleeding and bruising

PICC complications

Complications should be documented and reported to appropriate members of the clinical team

Risk	Management
Air embolism Signs of an air embolism are: • Signs of breathlessness • Chest pain • Hypotension • Cardiac Arrest	This can occur due to unclamped / open lumen or on removal of PICC. Turn patient left side down, trendelenburg position (head down). Administer 100% oxygen and call emergency team on 2222 or 999 if in community setting
Infection	Device should be inspected for signs of infection or phlebitis each time it is accessed or at least once daily – minimum whilst an in-patient / acute areas. Device should be inspected for signs of infection or phlebitis at each visit for patients receiving care at home / community – minimum Document care and findings on CVC care plan. Act on findings as appropriate. Monitor vital signs. Seek advice on swabbing CVC site / removal of CVC. Monitor vital signs
Extravasation	Stop infusion immediately; leave PICC in situ initially; aspirate any fluid; NEVER flush PICC. Seek immediate advice from pharmacy and medical staff prior to removing PICC, who may advise administration suitable neutralising agent. The PICC can then be removed and re-sited Apply hot pack or cold pack, if appropriate. Subsequent management depends upon the drug involved and degree of damage. Mark area of redness with skin marker. Report in Datix. For Systemic Anti Cancer Therapies to refer to the WoS Extravasation in Practice, Policy, Guidance and Tools
Occlusion	Flush catheter with IV 0.9% sodium chloride 2-3mls using a brisk push / pause flushing technique, check if blood can now be aspirated. If successful, flush with normal flushing procedure. If not successful consider urokinase administration – see templates. *Paediatric and neonatal services – volume may differ. Refer to local guidelines. Do not flush if resistance felt.
Catheter fracture	Inspect PICC on removal. If obvious damage to PICC, report to medical team
Bleeding following PICC removal	Lie the patient flat, apply pressure to puncture site until homeostasis is achieved and seek senior nursing and medical help
Haematoma	Apply pressure to puncture site, monitor site.
Leaking / cracking of catheter or hub	Remove PICC and send for analysis / report to manufacturer.

Non-tunnelled CVC site assessment and flush

Statement	The CVC patency must be assessed for signs of complications and to reduce patient harm. To ensure patients receive prescribed medications, in a safe and timely manner
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 10ml syringe(s) 0.9% sodium chloride amp(s) 23g safety hypodermic needle or blunt filter needle(s) 2% chlorhexidine and 70% isopropyl alcohol wipe Clinical waste bag
Timing	As often as necessary to administer medications as prescribed; once every 24 hours if CVC not be used for administration of IV fluids or medicines. For patients receiving care in the community, the VAD should be inspected at each visit and flushed at least every 7 days.
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Apply PPE • Scrub the hub for 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol wipe and allow to dry • Ensure catheter / device is clamped • Using an aseptic non touch technique, attach the sodium chloride filled syringe to needle free access device, secure, unclamp lumen / catheter and flush catheter / device using push / pause technique. Repeat for each lumen if required. * Neonates / paediatric may consider a smaller volume of flush • On completion of flush administration, keep positive pressure on plunger, apply clamp and disconnect syringe • Check all sutures holding catheter / device are in place and secure
	* Paediatrics – If no infusion to be connected, or lumens not being used, CVC lumen may be flushed with 10iu / ml heparinised saline. Seek advice.
	• Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete CVC care plan VAD is positioned to ensure skin health is maintained

Non-tunnelled CVC dressing change

Statement	The non-tunnelled CVC is secured with an appropriate dressing, whilst allowing for inspection of the insertion point
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine and 70% isopropyl alcohol wand or stick Semi permeable transparent dressing (consider use of chlorhexidine impregnated dressing to reduce risk of CRBSI) Clinical waste bag
Timing	Every 7 days or as required if dressing is visibly loose or soiled if using a semi permeable sterile dressing
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Using an aseptic non touch technique open sterile dressing pack, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Carefully remove existing dressing • Discard / change gloves if dressing heavily contaminated with body fluids • Cleanse area around entry site using 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice pattern' and allow to dry • Check all sutures holding catheter / device are in place and secure • Apply dressing ensure adherence and visibility of insertion site • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	Record procedure in nursing documentation and complete CVC care plan VAD is positioned to ensure skin health is maintained

Tunnelled or non-tunnelled CVC needle free access device change

Statement	The individual lumens and access ports of a CVC should have a needle free access device attached to reduce the risk of catheter related blood stream infections
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Needle free access device(s) 2% chlorhexidine and 70% isopropyl alcohol wipe(s) Clinical waste bag
Timing	Every 7 days or as manufacturer recommendations
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Ensure catheter / device lumen is clamped • Detach needle free access device • 'Scrub the hub' with 2% chlorhexidine and 70% isopropyl alcohol wipe for 30seconds and allow to dry • Attach new (primed) needle free access device • Unclamp catheter / device if to be used, if not reposition clamp • Check all sutures holding catheter / device are in place and secure • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Non-tunnelled CVC / tunnelled uncuffed CVC removal

Statement	CVC removal should be considered when there is no longer a clinical need for the device, infection is suspected or a more permanent VAD is required
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Dressing pack Stitch cutter 2% chlorhexidine and 70% isopropyl alcohol stick / wand Hydrocolloid dressing Clinical waste bag / sharps bin
Timing	When there is no further clinical need or proven infection of the device.
Procedure	• Explain the process to the patient / child and parent and gain consent, and should include a description of timed inspiration and breath holding • Patient **MUST BE** in bed lying flat in a head-down-tilt position unless contraindicated – seek advice • Perform hand hygiene • Using an aseptic non touch technique open sterile dressing pack. Using an aseptic non touch technique, open sterile field and assemble equipment • Perform hand hygiene • Apply PPE • Carefully remove dressing and discard • Discard / change gloves if heavily contaminated with body fluids • Cleanse the area with the 2% chlorhexidine and 70% isopropyl alcohol wand for 30 seconds and allow to dry • Remove the securing sutures
Ask patient to hold their breath and perform a Valsalva Manoeuvre. If valsalva cannot be performed, the catheter should be removed on expiration. ** Increasing the intra thoracic pressure is different in a spontaneous breathing patient and a patient receiving positive pressure ventilation. (please see specific instructions as overleaf)	
	• As the CVC is being withdrawn / removed, cover insertion site with a sterile swab, applying gentle pressure at the insertion site as the catheter is being removed • Apply firm pressure immediately to insertion site until haemostasis is achieved • Cover the site with a hydrocolloid dressing, ensuring a good adherence of the dressing to the skin • After removal the CVC should be inspected for integrity, length and damage • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene • Patients may then be returned to a comfortable position
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record
Air embolism is a significant risk if procedure not followed. If suspected, turn patient left side down (Trendelenburg position), administer 100% oxygen and call 2222	

Non-tunnelled CVC / tunnelled uncuffed CVC removal (Cont'd)

** **Spontaneous Breathing / Non Ventilated Patients / CPAP only / PSV or NIV (when PS set at zero):** In these situation the removal must be timed with **expiration** (because the intra thoracic pressure is at its highest)

Instruct the patient to hold their breath & where possible perform a Valsalva Manoeuvre

If valsalva cannot be performed, the catheter should be removed on expiration

** **Patient receiving Positive Pressure Ventilation (fully ventilated) PSV or NIV (when PS is set higher than zero**): In these situations the removal must be timed with **inspiration** (because the intra thoracic pressure is at its highest)

Tunnelled CVC weekly flush and lock

Statement	To ensure safe care and maintenance of catheter / device and maintain patency of catheter / device when not in continuous use
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 10ml syringe(s) IV 0.9% Sodium Chloride (NaCl) amp(s) 23g safety hypodermic needle(s) or blunt fill filter needle(s) 2% chlorhexidine and 70% isopropyl alcohol wipe Clinical waste bag
Timing	Every 7days
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley with disinfectant wipes • Perform hand hygiene • Apply PPE • 'Scrub the hub' for 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol 70% wipe and allow to dry • Ensure catheter / device is clamped • If removing lock - using an aseptic non touch technique attach a 10ml syringe securely, unclamp catheter / device and aspirate approx 3-4mls of fluid, clamp catheter / device. Detach filled syringe. Scrub the hub for 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol wipe and allow to dry • Using an aseptic non touch technique attach the 0.9% NaCl filled syringe to needle free access device, secure, unclamp catheter / device flush catheter / device, using push / pause mechanism and maintaining positive pressure on plunger of syringe. Repeat for each lumen if required * Neonates / paediatric may consider a smaller volume of flush * Paediatrics – If no infusion to be connected, or lumens not being used, CVC lumen may be flushed with 10iu / ml heparinised saline. Seek advice. • Clamp catheter / device. Detach syringe • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Cuffed tunnelled CVC exit site suture removal and dressing change

Statement	The cuffed tunnelled CVC is dressed with an appropriate dressing, whilst allowing for inspection of the exit site.
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine and 70% isopropyl alcohol wand or stick Stitch cutter Semi permeable transparent dressing Clinical waste bag / sharps bin
Timing	Every 7 days or when dressing is visibly loose or soiled After 3 weeks the purse string suture can be removed as Dacron cuff will have subcutaneously embedded
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Carefully remove existing dressing • Discard / change gloves if dressing is heavily contaminated with body fluids • Cleanse area around entry site with 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice' pattern for 30 secs and allow to dry • Remove sutures • Apply dressing ensuring good adherence to the skin • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Tunnelled CVC entry site dressing change

Statement	A tunnelled CVC entry site is covered with an appropriate dressing, whilst allowing for inspection of the entry point
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine and 70% isopropyl alcohol wand or stick Sterile dressing Clinical waste bag
Timing	After 7 days or when dressing is visibly loose or soiled.
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Carefully remove existing dressing and steri-strips • Discard / change gloves of dressing is heavily soiled with body fluids • Cleanse area around entry site with 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice' pattern for 30 secs and allow to dry • Apply dressing ensure adherence • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Tunnelled CVC exit site dressing change

Statement	The tunnelled CVC is covered with an appropriate dressing, whilst allowing for inspection of the exit site
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 2% chlorhexidine and 70% isopropyl alcohol wand or stick Semi permeable transparent dressing (consider use of chlorhexidine impregnated dressing to reduce risk of CRBSI) Clinical waste bag
Timing	Every 7 days or when the dressing is visibly loose or soiled.
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Carefully remove existing dressing • Discard / change gloves if dressing is heavily soiled with body fluids • Cleanse area around entry site with 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice' pattern for 30 seconds and allow to dry • Inspect exit site and surrounding skin for signs of phlebitis or infection • Apply dressing - ensure adherence • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and complete CVC care plan or CVC patient held record VAD is positioned to ensure skin health is maintained

Cuffed tunnelled CVC removal

Removal of cuffed tunnelled CVC should be undertaken by specially trained and competent practitioners. This would normally be undertaken in the area that was responsible for the insertion e.g. Vascular Access Service, theatre, radiology services or haematology clinical nurse specialists.

CVC complications

Complications should be documented and reported to appropriate members of the clinical team.

Risk	Management
Infection	Device should be inspected for signs of infection or phlebitis each time it is accessed or at least once daily – minimum whilst an in-patient / acute areas. Device should be inspected for signs of infection or phlebitis at each visit for patients receiving care at home / community - minimum Document care and findings on CVC care plan. Act on findings as appropriate. Monitor vital signs. Seek advice on swabbing CVC site / removal of CVC.
Leaking / cracking of catheter or hub	Remove CVC and send for analysis / report to manufacturer.
Extravasation	Stop infusion immediately; leave CVC in situ initially; aspirate any fluid; NEVER flush CVC. Seek immediate advice from pharmacy and medical staff prior to removing CVC, who may advise administration suitable neutralising agent. The CVC can then be removed and re-sited Apply hot pack or cold pack, if appropriate. Subsequent management depends upon the drug involved and degree of damage. Mark area of redness with skin marker. Report in Datix. For Systemic Anti Cancer Therapies to refer to the WoS Extravasation in Practice, Policy, Guidance and Tools
Air embolism Signs of an air embolism are: • Signs of breathlessness • Chest pain • Hypotension • Cardiac Arrest	This can occur due to unclamped / open lumen or on removal of CVC. Turn patient left side down, trendelenburg position (head down). Administer 100% oxygen and call emergency team on 2222 or 999 if in community area.
Active bleeding following CVC removal	Apply pressure, lie the patient flat and seek senior nursing and medical help
Occlusion	Flush catheter with IV 0.9% sodium chloride 2-3mls using a brisk push / pause flushing technique, check if blood can now be aspirated. If successful, flush with normal flushing procedure. If not successful consider urokinase administration with tunnelled CVCs – see templates. *Paediatric and neonatal services – volume may differ. Refer to local guidelines. Do not flush if resistance felt.
Dacron cuff is visibly exposed	Catheter should be removed and replaced if therapy is to continue - seek advice

Dialysis CVC (tunnelled and non-tunnelled) dressing change

Statement	The non-tunnelled and tunnelled double lumen dialysis CVC insertion sites and patency must be assessed for signs of complications to reduce patient harm. There is a high risk for the introduction of organisms through the exit site
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley 2% chlorhexidine in 70% isopropyl alcohol wand / stick Sterile semi permeable transparent dressing (consider use of chlorhexidine impregnated dressing to reduce risk of CRBSI) Clinical waste bag
Timing	All non-tunnelled and tunnelled dialysis CVC exit sites are redressed every 7 days or as required if dressing is visibly loose or soiled
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Carefully remove existing dressing • Discard / change of gloves if dressing is heavily contaminated with body fluids • Inspect the site and surrounding skin for signs of infection or phlebitis • Clean site using 'lattice' pattern with 2% chlorhexidine in 70% isopropyl alcohol for 30 seconds and allow to dry • Apply sterile dressing ensuring adherence • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and CVC care plan or dialysis book Inspect the CVC / insertion site for • Integrity of the CVC • Insertion site and surrounding tissue for signs of phlebitis or infection VAD is positioned to ensure skin health is maintained

Paediatric Dialysis CVC (tunnelled and non-tunnelled) dressing change

Statement	The non-tunnelled and tunnelled double lumen dialysis CVC insertion sites and patency must be assessed for signs of complications to reduce patient harm. There is a high risk for the introduction of organisms through the exit site
Requirements	PPE (minimal consideration disposable apron and disposable gloves) Sterile gloves Clean tray / trolley Dressing pack 2% chlorhexidine in 70% isopropyl alcohol wand / stick Sterile semi permeable transparent dressing (consider use of chlorhexidine impregnated dressing/patch to reduce risk of CRBSI) Tape (to fix around edges of dressing) Mobiliser (used to fix and secure wings of line) Clinical waste bag
Timing	All non-tunnelled and tunnelled dialysis CVC exit sites are redressed every 7 days or as required if dressing is visibly loose or soiled
Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley/ tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using a aseptic non touch technique, assemble sterile field, open all other equipment onto sterile field • Perform hand hygiene • Apply PPE • Carefully remove existing dressing • Dispose of soiled dressing and then remove gloves • Perform hand hygiene • Apply sterile gloves • Inspect the site and surrounding skin for signs of infection or phlebitis • Clean site using 'lattice' pattern with 2% chlorhexidine in 70% isopropyl alcohol for 30 seconds and allow to dry • Apply mobiliser to wings to secure position of device • Apply sterile dressing ensuring adherence using tape around edges • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
Aftercare	• Record procedure in nursing documentation and CVC care plan or dialysis book Inspect the CVC / insertion site for • Integrity of the CVC • Insertion site and surrounding tissue for signs of phlebitis or infection • VAD is positioned to ensure skin health is maintained

Dialysis CVC (tunnelled and non tunnelled) dressing change, flush and lock

Statement	To ensure safe care and maintenance of catheter / device and maintain patency of catheter / device when not in continuous use
Requirements	PPE (minimal consideration of gloves and aprons) Clean tray / trolley Dressing pack 2 x 30ml luer lock syringe 2 x 5ml luer lock syringes 2 x 10ml luer lock syringes IV 0.9% Sodium Chloride (NaCl) amp(s) TauraHep 500 - volume as guided by size of catheter (*refer to manufacturer recommendations for exact volume) CVC catheter caps Sterile semi permeable dressing 21g safety hypodermic needle 2% chlorhexidine and 70% isopropyl alcohol wipe and applicator Clinical waste bag / sharps bin
Timing	As required
Aftercare	• Document procedure in nursing notes and CVC care plan or Dialysis book VAD is positioned to ensure skin health is maintained

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile file, open all other equipment onto sterile field • Apply PPE, consider eye protection (visor) • Carefully remove existing dressing • Discard / change of gloves if dressing is heavily contaminated with body fluids • Attach syringe(s) to sterile needle draw up 20mls of 0.9% sodium chloride , expel all air, place on sterile field • Attach 10ml sterile syringe(s) to needle draw up an **appropriate** volume of TauraHep500, expel all air, place in sterile field • Place sterile drape under catheter lumens • Clean exit site with 2% chlorhexidine and 70% isopropyl alcohol applicator for 30 secs and allow to dry • Apply sterile dressing • 'Scrub the cap' - each CVC cap for 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol wipe and allow to dry. A separate wipe should be used for each lumen • Ensure clamps are **closed**. Remove CVC catheter cap from **red** (access) lumen • Attach 5ml luer lock syringe to **red** lumen, unclamp and remove 2.5ml of blood stained fluid. Apply clamp. • Repeat previous 2 steps for the **blue** (return) lumen • Disconnect syringe and immediately attach 30ml syringe filled with 20ml 0.9% sodium chloride solution to **red** lumen, unclamp and flush lumen using a push / pause technique. Keep positive pressure on plunger. Apply clamp. Repeat for **blue** lumen. * Neonates / paediatric may consider a smaller volume of flush • Disconnect syringe and immediately attach primed syringe with TauaHep500 to **red** lumen, unclamp and insert appropriate volume of lock into **red** lumen. Keep positive pressure on plunger. Apply clamp. • Repeat for **blue** lumen • Disconnect syringe and immediately attach sterile CVC catheter caps to both **red** and **blue** lumen • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Paediatric Dialysis CVC (tunnelled and non tunnelled) dressing change, flush and lock

Statement	To ensure safe care and maintenance of catheter / device and maintain patency of catheter / device when not in continuous use
Requirements	PPE (minimal consideration of gloves and aprons) Sterile gloves Clean tray / trolley Dressing pack with sterile swabs 2 x 2.5ml or 5ml luer lock syringes 4 x 10ml luer lock syringes IV 0.9% Sodium Chloride (NaCl) amp(s) Alteplase - volume as guided by size of catheter (*refer to manufacturer recommendations for exact volume). (Alternatively, tauralock or heparin 1000 units/ml may be used when advised by local standard operating procedure (SOP) or microbiology) CVC catheter caps Sterile semi permeable transparent dressing (consider use of chlorhexidine impregnated dressing/patch to reduce risk of CRBSI) Tape (to secure the edges of the dressing) Mobiliser (to fix and secure the wings of the line) 21g safety hypodermic needle 2% chlorhexidine and 70% isopropyl alcohol wipe and applicator Clinical waste bag / sharps bin
Timing	As required
Aftercare	• Document procedure in nursing notes and CVC care plan or Dialysis book • VAD is positioned to ensure skin health is maintained

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack. Using an aseptic non touch technique, assemble sterile file, open all other equipment onto sterile field • Apply PPE, consider eye protection (visor) • Carefully remove existing dressing • Dispose of soiled dressing and remove non sterile gloves. • Perform hand hygiene • Apply sterile gloves • Attach 10ml syringe(s) to sterile needle draw up 10mls of 0.9% sodium chloride , expel all air, place on sterile field • Attach 2.5ml or 5ml sterile syringe(s) to needle draw up an **appropriate** volume of alteplase, expel all air, place in sterile field • Ensure clamps are **closed**. Remove CVC catheter cap from **red** (access) lumen • 'Scrub the cap' - each CVC lumen/cap for 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol wipe and allow to dry. A separate wipe should be used for each lumen. Place a sterile swab under each lumen to maintain asepsis • Place sterile drape under catheter lumens • Attach 10ml luer lock syringe to **red** lumen, unclamp and remove lock volume of blood stained fluid using a 10ml syringe. Apply clamp. • Repeat previous step for the **blue** (return) lumen
	• Disconnect syringe and immediately attach 10ml syringe with 0.9% sodium chloride solution to **red** lumen, unclamp and flush lumen using a push / pause technique. Keep positive pressure on plunger. Apply clamp. Repeat for **blue** lumen. **Neonates / paediatric may consider a smaller volume of flush • Disconnect syringe and immediately attach primed syringe with alteplase to **red** lumen, unclamp and insert appropriate volume of lock into **red** lumen. Keep positive pressure on plunger. Apply clamp. • Repeat for **blue** lumen • Disconnect syringe and immediately attach sterile CVC catheter caps to both **red** and **blue** lumen • Clean exit site with 2% chlorhexidine and 70% isopropyl alcohol applicator for 30 secs and allow to dry • Apply sterile dressing • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Non-tunnelled dialysis CVC removal

Statement	CVC removal should be considered when there is no longer a clinical need for the device, infection is suspected or a more permanent VAD is required
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Dressing pack Stitch cutter 2% chlorhexidine and 70% isopropyl alcohol stick / wand Hydrocolloid dressing Clinical waste bag / sharps bin
Timing	When there is no further clinical need or proven infection of the device.
Procedure	• Explain the process to the patient / child and parent and gain consent, and should include a description of timed inspiration and breath holding • Patient **MUST BE** in bed lying flat in a head-down-tilt position *Paediatrics – head down tilt may be contraindicated, seek advice • Perform hand hygiene • Using an aseptic non touch technique open sterile dressing pack. Using an aseptic non touch technique, open sterile field and assemble equipment • Perform hand hygiene • Apply PPE • Carefully remove dressing and discard • Discard / change gloves if heavily contaminated with body fluids • Cleanse the area with the 2% chlorhexidine and 70% isopropyl alcohol wand for 30 seconds and allow to dry • Remove the securing sutures
Ask patient to hold their breath and perform a Valsalva Manoeuvre. If valsalva cannot be performed, the catheter should be removed on expiration. ** Increasing the intra thoracic pressure is different in a spontaneous breathing patient and a patient receiving positive pressure ventilation. (please see specific instructions as overleaf)	
	• As the CVC is being withdrawn / removed, cover insertion site with a sterile swab, applying gentle pressure at the insertion site as the catheter is being removed • Apply firm pressure immediately to insertion site until haemostasis is achieved • Cover the site with a hydrocolloid dressing, ensuring a good adherence of the dressing to the skin • After removal the CVC should be inspected for integrity, length and damage • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene • Patients may then be returned to a comfortable position
Air embolism is a significant risk if procedure not followed. If suspected, turn patient left side down (Trendelenburg position), administer 100% oxygen and call 2222	

** **Spontaneous Breathing / Non Ventilated Patients / CPAP only / PSV or NIV (when PS set at zero):** In these situation the removal must be timed with **expiration** (because the intra thoracic pressure is at its highest) Instruct the patient to hold their breath & where possible perform a Valsalva Manoeuvre (forced expiration with mouth closed) If valsalva cannot be performed, the catheter should be removed on expiration ** **Patient receiving Positive Pressure Ventilation (fully ventilated) PSV or NIV (when PS is set higher than zero**): In these situations the removal must be timed with **inspiration** (because the intra thoracic pressure is at its highest)

Aftercare	Minimize activity for at least one hour post removal Observe the patient's NEWS / PEWS / vital signs Observe insertion site for signs of leakage, haemorrhage, or haematoma. Assess the site for bleeding every 5 minutes for 30 minutes, then every 30 minutes Observe limb closest to insertion site for signs of swelling and or pain Dressing must remain in situ for a minimum of 24 hours following CVC removal and then dressed as required until site has healed Record in the nursing documentation and the CVC care plan or dialysis book For femoral venous catheters: Nurse patient flat for 2 hours when possible. Apply pressure for at least 15 minutes. Ensure complete cessation of bleeding ensured prior to applying dressing. Do not allow hip flexion during this period

Tunnelled dialysis CVC removal

Removal of tunnelled dialysis CVCs should be undertaken by specially trained and competent practitioners. This would normally be undertaken in the area that was responsible for the insertion e.g. Vascular Access Service or Renal Service.

Urokinase administration in complete catheter occlusion

*Alternative anti-thrombolytic solution may be used if Urokinase is not available

Statement	Complete catheter occlusion is when there is an inability to infuse any solution into the catheter together with the inability to aspirate any blood from it. Complete occlusion can result from thrombotic and non thrombotic causes. A **thrombotic complete occlusion** develops as a result of a build- up of blood within the catheter. If a **thrombus** within the line is suspected, practitioners should consider the use administration of urokinase and proceed with steps outlined below.
Troubleshooting	**Before proceeding with urokinase administration check the following:** • Withdrawal of blood and flushing has already been attempted (see appropriate templates) • No kinks / clamps occluding the catheter • Ask the patient to take a deep breath in and hold whilst attempting to aspirate the catheter • Try altering the position of the arm and / or 30° head down tilt • If clamps are present, move clamp further down the catheter then roll the previously clamped section in your fingers gently to ensure that the catheter walls are not 'stuck' together' • Prior to administering urokinase, an x-ray may be obtained to verify the correct position of the catheter in a blood vessel
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 10ml syringe(s)* 23g safety hypodermic needle(s) or blunt fill filter needle(s) 2% chlorhexidine in 70% isopropyl alcohol wipes Urokinase 5,000 units per lumen reconstituted with 0.9% sodium chloride 2mls per lumen Heparinised saline (10 units / ml) 2ml per lumen** (if required) 3-way tap (not required in fibrin sheath) ***Implanted port:*** 5ml heparinised saline 5ml urokinase 5,000 units per lumen reconstituted with 0.9% sodium chloride Gripper / Huber needle • Length (3 / 4 inch, 1 inch or 1 ¼ inch): dependant on the amount of subcutaneous tissue between the skin surface and the port • Gauge (19 or 22) dependant on the viscosity of the fluid to be infused
Timing	When clinically necessary but only within normal working hours (09.00 – 17.00). This should be conducted in a hospital environment and must always be prescribed.
Aftercare	• Document in patient notes, CVC care plan or CVC patient held record Ongoing care and maintenance should be undertaken.

Procedure	Explain to patient and gain consent Perform hand hygiene Open sterile dressing pack. Using a non touch technique, assemble equipment onto the sterile field Perform hand hygiene Apply PPE Place the sterile drape to create a sterile field Using a 10ml syringe reconstitute the urokinase vial to achieve 5,000 units in 2mls per lumen Prime the 3-way tap with the urokinase solution at 3 o'clock access point on the tap. **Do not disconnect the syringe** Scrub the hub of needle free access device with 2% chlorhexidine in 70% isopropyl alcohol wipe for at least 30 seconds and allow to dry Using a non touch technique attach 3 way tap to needle free access device Using a non touch technique attach an empty syringe to port at 6 o'clock position. Ensure the three way tap is now open to the lumen and the 6 o'clock position. Pull gently back on the empty syringe plunger to create a vacuum in the catheter to approximately 8mls and hold the plunger at 8mls whilst turning the closed position onto the empty syringe. Turn 3 way tap so that it is open to the urokinase and the line A small amount of urokinase will then be drawn into vacuum. **Remove the empty syringe and expel air from the empty syringe** Repeat process of creating vacuum and administering urokinase until the 2ml volume is administered. Remove empty syringes and disconnect 3 way tap When urokinase successfully administered, leave for 20-60mins and then withdraw the urokinase lock If the catheter has an external clamp this should be left unclamped while the urokinase lock is in situ Discard all disposable equipment Remove PPE and discard as healthcare waste Perform hand hygiene
	To withdraw urokinase lock: Using a non touch technique, attach a sterile 10ml syringe attempt to withdraw blood **If unsuccessful**, this process can be repeated a further once in 24 hours. Practitioners may consider leaving urokinase insitu for a period of 12 to 24 hours. This must be done with consultation of medical teams and the patient must remain as an inpatient for this period **If successful,** discard aspirated blood stained fluid and flush / lock line with 0.9% Sodium Chloride 10mls and heparinised saline (10 international units / ml) 2ml per lumen

Urokinase administration in persistent withdrawal occlusion

Statement	Persistent Withdrawal Occlusion (PWO) can be described as the inability to withdraw blood via the catheter while retaining the capacity to infuse solutions without difficulty. The main significance of PWO is that the practitioner cannot be certain that the catheter is in the correct position when there is no free flowing blood return. A satisfactory blood return is the verification that the catheter is in a vein and that the catheter is functioning correctly prior to any intravenous therapy.
Troubleshooting	**Before proceeding with urokinase administration check the following:** • Withdrawal of blood and flushing has already been attempted (see appropriate templates) • No kinks / clamps occluding the catheter • Ask the patient to take a deep breath in and hold whilst attempting to aspirate the catheter • Try altering the position of the arm and / or 30° head down tilt • If clamps are present, move clamp further down the catheter then roll the previously clamped section in your fingers gently to ensure that the catheter walls are not 'stuck' together' • Prior to administering urokinase, an x-ray may be obtained to verify the correct position of the catheter in a blood vessel
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack 10ml syringe(s)* 23g safety hypodermic needle(s) or blunt fill filter needle(s) 2% chlorhexidine in 70% isopropyl alcohol wipes Urokinase 5,000 units per lumen reconstituted with 0.9% sodium chloride 2mls per lumen Heparinised saline (10 units / ml) 2ml per lumen** (if required) 3-way tap (not required in fibrin sheath) ***Implanted port:*** 5ml heparinised saline 5ml urokinase 5,000 units per lumen reconstituted with 0.9% sodium chloride Gripper / Huber needle • Length (3 / 4 inch, 1 inch or 1 ¼ inch): dependant on the amount of subcutaneous tissue between the skin surface and the port • Gauge (19 or 22) dependant on the viscosity of the fluid to be infused
Timing	When clinically necessary but only within normal working hours (09.00 – 17.00). This should be conducted in a hospital environment and must always be prescribed.
Aftercare	• Document in patient notes or CVC care plan or CVC patient held record Ongoing care and maintenance should be undertaken

Procedure	Explain to patient and gain consent Perform hand hygiene Open sterile dressing pack. Using a non touch technique, assemble equipment onto the sterile field Perform hand hygiene Apply PPE Place the sterile drape to create a sterile field Using a 10ml syringe reconstitute the urokinase vial to achieve 5,000 units in 2mls per lumen Scrub the hub of needle free access device with 2% chlorhexidine in 70% isopropyl alcohol wipe for at least 30 seconds and allow to dry Connect 10ml syringe filled with urokinase to the needle free access device and using push pause technique to deliver the 2 ml solution. Repeat for other lumen. **If the catheter has an external clamp this should be left unclamped while the urokinase lock is in situ** Discard all disposable equipment Remove PPE and discard as healthcare waste Perform hand hygiene Leave the urokinase in situ for 20 -60 minutes, and then withdraw the urokinase lock
	To withdraw urokinase lock: Using a non touch technique, attach a sterile 10ml syringe attempt to withdraw blood **If successful**, discard aspirated blood stained fluid and flush/lock line with 10 ml 0.9% sodium chloride and (10 unit / ml) heparinised saline 2ml per lumen **If unsuccessful**, this process can be repeated a further once in 24 hours, practitioners may consider leaving urokinase insitu for a period of 12 to 24 hours. This must be done with consultation of medical teams and the patient must remain as an inpatient for this period.

Implanted Ports (Port-a-Cath®) - Administration of flush and patency assessment

Statement	To maintain the patency of the device when not in continuous use and to optimise the lifespan of the (Port-a-cath®). It is essential that the necessary care and maintenance of the device must be performed in relation to flushing
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack or drapes. 10ml syringes 21g safety hypodermic needles 18g blunt filter needle for glass ampoule 2% chlorhexidine and 70% isopropyl alcohol wipe 70% isopropyl alcohol impregnated swabs, one for each vial or ampoule 2% chlorhexidine and 70% isopropyl alcohol applicator Appropriate size 'Gripper' / 'Huber' needle, depending on type of Port-a-cath® Needle Free Access Device Topical anaesthetic cream Prescription Sheet Sodium Chloride 0.9% for routine flushing Heparin Sodium 10iu / ml - should be used when port is in daily use Heparin Sodium 100iu / ml - should **only** be used prior to needle being removed. The volume of the flush solution can vary depending on the patient age, make of device, catheter size and nature and type of infusion / medication. A minimum volume of flush is at least twice the volume of the catheter. Clinical waste bag / sharps bin
Timing	The Port-a-cath® device requires to be flushed before and after and in between medicine administration, or IV Fluids, after collecting blood samples and monthly when the port is not in use.
Aftercare	Document in nursing notes

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Ascertain that the patient has had no pain or discomfort with the Port-a-cath® before palpating the position of the portal. If pain or swelling present seek expert advice • Prior to accessing the port, topical anaesthetic may be applied over the site, covered with an adhesive semi-permeable dressing. Leave for recommended duration for maximum anaesthetic effect • Ensure that the topical anaesthetic has been removed immediately prior to preparing the site for access • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack and assemble all equipment using an non-touch technique onto sterile field • Perform hand hygiene • Apply PPE • Draw up and prepare flushing agents and prescribed medicines / fluids in accordance with Medicine policy • Prime "GRIPPER®" needle with 0.9% sodium chloride (approximately 2mL if has extension tubing) clamp lumen closed and remove syringe. • Connect the primed needle free access device to the port needle hub. • Place drape below Port-a-cath® site. • Cleanse area at port site using 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice pattern' and allow to dry • Using an aseptic technique palpate and stabilize the portal septum • Insert "GRIPPER®" needle at a 90° angle until base of portal septum felt with needle • Attach empty syringe, unclamp catheter, withdraw 3- 5mL of blood stained fluid • If no blood flash-back is observed try check patient position / correct needle placement. Medical referral may need to be considered • Clamp line and remove syringe • Scrub the hub and clamp and needle free device using 2% chlorhexidine and 70% isopropyl alcohol wipe for 30 seconds and allow to dry • Attach syringe with 0.9% sodium chloride. Unclamp lumen, slowly inject 5ml 0.9% sodium chloride using push / pause technique • Keep positive pressure on plunger, apply clamp and disconnect syringe • If Port-a-cath® needle has to remain insitu for further use then flush with Heparinised Sodium Chloride (10iu / ml) using a pulsating push / pause technique. On completion, keep positive pressure on plunger, apply clamp and disconnect syringe • If Port-a-cath® needle is being removed catheter must have final flush with Heparinised Sodium Chloride (100iu / ml) using a pulsating push / pause technique. On completion, keep positive pressure on plunger, apply clamp and

	disconnect syringe • Secure Port-a-cath® needle with a semi permeable dressing, if to be left in situ • Scrub the hub with 2% chlorhexidine and 70% isopropyl alcohol solution for minimum of 30 seconds and allow to dry • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
	• **Port-a-cath® needle removal** - this should only be undertaken by a specially trained and competent practitioner • Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Stabilise the port with two gloved fingers of one hand and withdraw needle with other hand • Apply pressure if bleeding until bleeding stops. • Apply sterile adhesive dressing if required. • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Implanted ports (Port-a-Cath®) - administration of medications or IV fluids

Statement	Intravenous medications and fluids are administered in a safe and timely manner as prescribed in the patient's medication chart / drug kardex
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack or drapes 10ml syringes 21g safety hypodermic needles 18g blunt filter needle for glass ampoule 2% chlorhexidine and 70% isopropyl alcohol wipe 70% isopropyl alcohol impregnated swabs, one for each vial or ampoule 2% chlorhexidine and 70% isopropyl alcohol applicator Appropriate size 'Gripper' / 'Huber' needle, depending on type of Port-a-cath® Needle Free Access Device Topical anaesthetic cream Sterile, semi permeable, transparent dressing IV Fluid administration set if required Prescription Sheet Prescribed Intravenous medications or IV fluids Sodium Chloride 0.9% for routine flushing Heparin Sodium 10 iu / ml - should be used when port is in daily use Heparin Sodium 100iu / ml - should **only** be used prior to needle being removed The volume of the flush solution can vary depending on the patient age, make of device, catheter size and nature and type of infusion / medication A minimum volume of flush is at least twice the volume of the catheter Clinical waste bag / sharps bin
Timing	Once Port-a-cath® needle is inserted the device can be used for administration of intravenous medications and fluids. The device must be flushed before, in between and after medication administration, when discontinuing infusion therapy and prior to removal of needle When required for administration of medicines in a bolus form or as an intermittent / continuous infusion the port needle and dressing may be left in place for up to 7 days Cystic Fibrosis patient may leave the gripper needle insitu for a maximum of 14 days when receiving IV medications
Aftercare	Document in nursing notes, patient drug kardex and fluid chart

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Ascertain that the patient has had no pain or discomfort with the Port-a-cath® before palpating the position of the portal. If pain or swelling present seek expert advice • Prior to accessing the port, topical anaesthetic may be applied over the site, covered with an adhesive semi-permeable dressing. Leave for recommended duration for maximum anaesthetic effect • Ensure that the topical anaesthetic has been removed immediately prior to preparing the site for access • Perform hand hygiene • Clean trolley / tray with disinfectant wipes • Perform hand hygiene • Open sterile dressing pack and assemble all equipment using an non-touch technique onto sterile field • Perform hand hygiene • Apply PPE • Draw up and prepare flushing agents and prescribed medicines / fluids in accordance with Medicine policy • Prime "GRIPPER®" needle with 0.9% sodium chloride (approximately 2mL if has extension tubing) clamp lumen closed and remove syringe • Connect the primed needle free access device to the port needle hub • Place drape below Port-a-cath® site • Cleanse area at port site using 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice pattern' and allow to dry • Using an aseptic technique palpate and stabilize the portal septum. • Insert "GRIPPER®" needle at a 90° angle until base of portal septum felt with needle • Attach empty syringe, unclamp catheter, withdraw 3- 5mL of blood stained fluid. • If no blood flash-back is observed try check patient position / correct needle placement. Medical referral may need to be considered • Clamp catheter and remove syringe • Secure with semi-permeable membrane dressing if needle remaining insitu for continued treatment • Scrub the hub and clamp and needle free device using 2% chlorhexidine and 70% isopropyl alcohol wipe for 30 seconds and allow to dry • Attach syringe with 0.9% sodium chloride. Unclamp lumen, slowly inject 5ml 0.9% sodium chloride using push / pause technique • Keep positive pressure on plunger, apply clamp and disconnect syringe • Attach syringe containing prescribed IV medications or attach IV Fluids via administration set. Unclamp and administer over recommended time. On completion, keep positive pressure on plunger, apply clamp. Disconnect syringe

	• Attach syringe with sodium chloride 0.9% Unclamp lumen, slowly inject 5ml 0.9% sodium chloride using push / pause technique. On completion, keep positive pressure on plunger, apply clamp. Disconnect syringe. • Repeat process depending on number of medications to be given • If Port-a-cath® needle has to remain insitu for further use then flush with Heparinised Sodium Chloride (10iu / ml) using a pulsating push / pause technique. On completion, keep positive pressure on plunger, apply clamp and disconnect syringe • If Port-a-cath® needle is being removed catheter must have final flush with Heparinised Sodium Chloride (100iu / ml) using a pulsating push / pause technique. . On completion, keep positive pressure on plunger, apply clamp and disconnect syringe • Scrub the hub with 2% chlorhexidine and 70% isopropyl alcohol solution for minimum of 30 seconds and allow to dry • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
	• **Port-a-cath® needle removal** - this should only be undertaken by a specially trained and competent practitioner • Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Stabilise the port with two gloved fingers of one hand and withdraw needle with other hand • Apply pressure if bleeding until bleeding stops • Apply sterile adhesive dressing if required • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Implanted ports (Port-a-cath®) blood sampling

Statement	To ensure that blood samples are easily and safely obtained as required from (Port-a-cath®)
Requirements	PPE (minimal consideration disposable apron and gloves) Clean tray / trolley Sterile dressing pack or drapes. 10ml syringes 21g safety hypodermic needles 18g blunt filter needle for glass ampoule 2% chlorhexidine and 70% isopropyl alcohol wipe 70% isopropyl alcohol impregnated swabs, one for each vial or ampoule 2% chlorhexidine and 70% isopropyl alcohol applicator Appropriate size 'Gripper' / 'Huber' needle, depending on type of Port-a-cath® Needle Free Access Device Topical anaesthetic cream Sterile, semi permeable, transparent dressing IV Fluid administration set if required Blood bottles Laboratory order forms Prescription Sheet Prescribed Intravenous medications or IV fluids Sodium Chloride 0.9% for routine flushing Heparin Sodium 10 iu / ml - should be used when port is in daily use Heparin Sodium 100iu / ml - should **only** be used prior to needle being removed. The volume of the flush solution can vary depending on the patient age, make of device, catheter size and nature and type of infusion / medication. A minimum volume of flush is at least twice the volume of the catheter. Clinical waste bag / sharps bin
Timing	The Port-a-cath® device requires to be flushed before and after obtaining blood specimens
Aftercare	Document procedure in nursing notes.

Procedure	• Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Ascertain that the patient has had no pain or discomfort with the Port-a-cath® before palpating the position of the portal. If pain or swelling present seek expert advice • Prior to accessing the port, topical anaesthetic may be applied over the site, covered with an adhesive semi-permeable dressing. Leave for recommended duration for maximum anaesthetic effect • Ensure that the topical anaesthetic has been removed immediately prior to preparing the site for access • Perform hand hygiene • Open sterile dressing pack and assemble all equipment using an aseptic non-touch technique onto sterile field • Perform hand hygiene • Apply PPE • Draw up and prepare flushing agents in accordance with Medicine policy • Prime "GRIPPER®" needle with 0.9% sodium chloride (approximately 2mL if has extension tubing) clamp lumen closed and remove syringe • Connect the primed needle free access device to the port needle hub • Place drape below Port-a-cath® site • Cleanse area at port site using 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice pattern' and allow to dry • Palpate and stabilize the portal septum maintaining asepsis • Insert "GRIPPER®" needle at a 90° angle until base of portal septum felt with needle • Attach empty syringe, unclamp and withdraw 3- 5mL of blood stained fluid. • If no blood flash-back is observed try check patient position / correct needle placement. Medical referral may need to be considered • Clamp catheter and remove syringe • Secure with semi-permeable membrane dressing if needle remaining for continued treatment • Scrub the hub of needle free device and clamp using 2% chlorhexidine and 70% isopropyl alcohol wand or stick in a 'lattice pattern' and allow to dry • Place catheter on a sterile drape. Ensure clamp is closed • Attach empty syringe and unclamp. Withdraw required amount of blood for specimen • Close clamp on lumen before removing syringe • Attach syringe with sodium chloride 0.9% unclamp lumen, slowly inject 5ml 0.9% sodium chloride using a push / pause technique. Reapply clamp • If Port-a-cath® needle has to remain insitu for further use then flush with heparinised Sodium Chloride (10iu / ml) using a pulsating push / pause technique. Keep positive pressure on plunger, apply clamp and disconnect syringe • If Port-a-cath® needle is being removed catheter must have final flush with Heparinised Sodium Chloride (100iu / ml) using a pulsating push / pause

	technique. Keep positive pressure on plunger, apply clamp and disconnect syringe • Clean needle free access port with 2% chlorhexidine and 70% alcohol solution for minimum of 30 seconds and allow to dry • Transfer blood sample to appropriate laboratory container(s) • Label samples in accordance with protocols and send to lab • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene
	Port-a-cath® needle removal - this should only be undertaken by a specially trained and competent practitioner. • Explain the process to the patient / child and parent and gain consent • Perform hand hygiene • Apply PPE • Stabilise the port with two gloved fingers of one hand and withdraw needle with other hand • Apply pressure if bleeding until bleeding stops. • Apply sterile adhesive dressing if required. • Discard all disposable equipment • Remove PPE and discard as healthcare waste • Perform hand hygiene

Implanted port removal

Removal of implanted ports should be undertaken by specially trained and competent practitioners. This would normally be undertaken in the area that was responsible for the insertion e.g. Radiology or Theatres.

Implanted port complications

Complications should be documented and reported to appropriate members of the clinical team

Risk	Management
Infection The tissue surrounding the site should be monitored throughout the procedure for: • Redness • Swelling • Discomfort surrounding the port	To ensure that appropriate steps are taken to prevent port infection and any other problems associated with the Port-a-cath® Device should be inspected for signs of infection or phlebitis each time it is accessed or at least once daily – minimum whilst an in-patient / acute areas. Device should be inspected for signs of infection or phlebitis each visit for patients receiving care at home / community - minimum Document care and act on findings as appropriate It is inadvisable to use the port in these circumstances – inform medical staff and document. Monitor vital signs.
Long term Port-a-cath® related complications can also occur. These include extravasation, catheter blockage due to thrombosis, local and systemic infection associated with the insertion and maintenance of Central Venous Catheters and breakdown of skin integrity over the portal.	Seek medical / nurse specialist advice. If a patient has pyrexia or complains of any symptoms such as pain, swelling or discolouration of the skin, a doctor or person expert in Port-a-cath® complications e.g. specialist nurses, should be informed immediately so that the problem can be investigated
Leaking / cracking of catheter or hub	Removal required and sent for analysis / report to company
Air embolism Signs of an air embolism are: • Signs of breathlessness • Chest pain • Hypotension • Cardiac arrest	Turn patient left side down, trendelenburg position (head down). Administer 100% oxygen. Call emergency team on 2222 or 999 if in a community setting

Troubleshooting for vascular access devices

Symptoms	Potential cause	Intervention
Systemic Infection		
Generally feeling unwell Pyrexia or rigor Increasing NEWS / PEWS	Bacteraemia	Refer to medical team – catheter may be removed; infection may be treatable without device removal depending on the patient's clinical status and colonising organism. Only take blood cultures from the catheter if it is thought to be the source of the infection. Obtain blood cultures from each lumen of the catheter and peripherally. Monitor vital signs / early warning score (NEWS / PEWS) – frequency will depend on patient's clinical status. Consider Sepsis! For catheter salvage – consider antibiotic or Taurolidine citrate (discuss with Microbiologist). **N.B. Taurolidine citrate is a pharmaceutical product which needs to be prescribed with the correct formulation** http://www.taurolock.com/en/download -en
Exit Site Infection		
Inflammation / phlebitis and tenderness at the exit site + / - exudate	Exit site infection	Obtain wound swab for culture and sensitivity. Redress exit site. If exudate present increase frequency of dressing change Refer to medical team, consider antibiotic therapy
Connector is sluggish or there is only intermittent free flow of fluids		
Difficulty in administering flush or medications or obtaining blood sample	Thrombus within the catheter Migration of the catheter tip Lipid aggregation (PN only) Medicine precipitation	Check that there are no kinks in the catheter. Ensure that the clamps are open, move the clamp further down the catheter then roll the previously clamped section between your fingers gently to ensure that the catheter walls are not 'stuck' together Try altering the position of the arm Flush catheter with IV 0.9% sodium chloride 2-3mls using a brisk push / pause flushing technique, check if blood can now be aspirated. If successful, flush with normal flushing procedure. If not successful consider urokinase administration – see templates. *Paediatric and neonatal services – volume may differ. Refer to local guidelines. Replace needle free access device Discontinue flush if resistance is felt.
Leakage from the external portion of the catheter		
Fluid / blood leaking	External catheter fracture	Stop infusate. If there is a clamp, clamp the catheter **ABOVE** the damaged area without delay to prevent possible air embolism. Cover the whole catheter with an occlusive dressing A single lumen catheter may be able to be repaired. This should be discussed without delay with the team who inserted it e.g. Chemotherapy team or Vascular Access Team If unable to repair, the catheter should be removed as soon as possible to minimize risk of infection and the risk of air embolism

Symptoms	Potential cause	Intervention
Extravasation	Migration of the catheter tip	Send for analysis / report to manufacturer Stop infusion immediately; leave VAD in situ initially; aspirate any fluid; NEVER flush VAD. Seek immediate advice from pharmacy and medical staff prior to removing VAD, who may advise administration suitable neutralising agent. The VAD can then be removed and re-sited Apply hot pack or cold pack, if appropriate. Subsequent management depends upon the drug involved and degree of damage. Mark area of redness with skin marker. Report in Datix. For Systemic Anti Cancer Therapies to refer to the WoS Extravasation in Practice, Policy, Guidance and Tools
Catheter Migration		
Increase or decrease in external length of catheter	Catheter Migration	**DO NOT PUSH THE CATHETER BACK IN** **Contact insertion team for advice** A chest x-ray should be carried out to review the position of the tip of the VAD and reviewed by appropriate practitioner Observe for any signs of thrombosis. The VAD may require to be removed if not in an appropriate position
Deep Venous Thrombosis / Upper Limb Vein Thrombosis		
Swelling of leg or shoulder / neck / arm or face with or without pain, inflammation, distension of the neck veins / peripheral vessels	Thrombosis	Refer to medical staff for further investigation and treatment If thrombosis suspected – consider diagnostic ultrasound to confirm diagnosis It may or may not be possible to treat thrombosis without catheter removal
Pain or visible swelling		
Pain and / or swelling when administering flush or fluids / medications	Internal catheter fracture Fibrin sheath Dislodgement of VAD	**Consult with senior medical staff. DO NOT USE the VAD.** Obtain chest x-ray to verify tip position. Internal catheter fracture cannot be repaired and will require to be removed. A fibrin sheath severe enough to cause extravasation at the exit site will normally indicate catheter removal
Patients unable to hold breath during removal of CVCs		
Patient unable to follow instructions or sedated	Sedation Acute confusion Long term clinical condition	If patient is unable to perform a valsalva manoeuvre, the CVC should be removed on **expiration**. If patient is receiving positive pressure ventilation, removal of CVC should be on **inspiration.** See removal templates for specific instructions.
Cuff exposure		
Dacron cuff is visibly exposed	Dislodgement of VAD / tugging of device / infection	Seek advice and consider removal of device

What care plan to use?	
Vascular access device	Care plan
Peripheral Venous Catheter (PVC)	PVC
Midline	PVC or midline
Peripherally Inserted Central Catheter (PICC)	CVC or CVC patient held record
Non-Tunnelled Central Venous Catheter	CVC
Tunnelled Central venous Catheter	CVC or CVC patient held record
Dialysis Central venous Catheter	CVC or Dialysis Book (Renal units only)
Implanted Ports (Port-a-cath ®)	None – document in nursing notes

Additional resource list

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